

## ABSTRACT

Ultra thin back-illuminated photodiode array structures and fabrication methods. The photodiode arrays are back illuminated photodiode arrays having a substrate of a first conductivity type having first and second surfaces, the second surface having a layer of the first conductivity type having a greater conductivity than the substrate. The arrays also have a matrix of regions of a first conductivity type of a higher conductivity than the substrate extending from the first surface of the substrate to the layer of the first conductivity type having a greater conductivity than the substrate, a plurality of regions of the second conductivity type interspersed within the matrix of regions of the first conductivity type and not extending to the layer of the first conductivity type on the second surface of the substrate, and a plurality of contacts on the first surface for making electrical contact to the matrix of regions of the first conductivity type and the plurality of regions of the second conductivity type.